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COUNTY OF LOS ANGELES
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March 17, 2005

TO: Each Supervisor

FROM: Thomas L. Garthwaite, M.D.
Director and Chief Medical Officer

fw Jonathan E. Fielding, M.D., M.P.H.
Director of Public Health and Health Officer

SUBJECT: **PUBLIC REPORTING OF HOSPITAL INFECTIONS AND OUTBREAKS**

In 2002, in the context of the *Los Angeles Times* articles about Legionella at Good Samaritan Hospital, issues were raised about public reporting of hospital infections and outbreaks. We responded to the Board's request to strengthen the Department's role in controlling outbreaks in health facilities by providing a plan to increase surveillance and reporting. In the three years, we have implemented new policies, augmented staff, and made important progress in achieving these goals.

In some cases, the steps we have taken since July 2002 are different than those originally outlined because some were determined to be not feasible. However, based on discussion with the Centers for Disease Control and Prevention (CDC), the State, and other large local health departments across the country, we appear to be doing more than any other local health department to enhance surveillance of hospital acquired infections.

We have worked with hospitals and other facilities to improve reporting and control of outbreaks. However, we believe it is time for hospitals to provide additional information which can be meaningful for consumers, particularly information about the hospitals prevention and control of hospital-acquired infections.

In early February 2005, Charlie Ornstein of the *Los Angeles Times* requested information from the Department under the California Public Records Act regarding public disclosure of certain infections associated with hospitals in Los Angeles County. He specifically requested:

1. The names of all hospitals that have reported infections to the Department of Health Services in each of the past three years, along with the types of infections reported and the number of patients involved, and

2. The ongoing release of such reports as they became available, going forward.

After conferring with County Counsel, the Department determined that the documents identified in his request are excepted from disclosure under the California Public Records Act by Government Code § 6254(k) because they are prohibited from disclosure by state law as implemented through the California Code of Regulations. We responded back to Mr. Ornstein accordingly (copy attached).

The requested records are acquired by DHS in response to communicable disease case reports made by hospitals within Los Angeles County. The information contained in these reports "is acquired in confidence and shall not be disclosed by the local health officer except as authorized by these regulations, as required by state or federal law, or with the written consent of the individual to whom the information pertains or the legal representative of the individual." (Title 17 *California Code of Regulations* § 2500(f).) The exceptions to the non-disclosure requirement provided by the regulations are listed in section 2501(f)(1)-(3), and are not applicable to the request. Thus, the County Health Officer is precluded by law from releasing the records described in the request.

However, we informed Mr. Ornstein that the Department supports the concept of public disclosures of meaningful information on healthcare-associated infections ("HAIs") in a manner that would assist consumers in considering healthcare options. While we consider information on individual cases or outbreaks to be most often not meaningful for consumers, information on hospitals' efforts to prevent and control hospital infections generally can be meaningful.

We have written to the California Department of Health Services to recommend that an appropriate system of public reporting of HAIs be developed and implemented, consistent with the Centers for Disease Control and Prevention (CDC) Healthcare Infection Control Practices Advisory Committee's (HICPAC) "Guidance on Public Reporting of Healthcare-Associated Infections" and existing State laws on release of information (copies attached). For example, we believe that process or outcome measures related to central-line insertion practices and associated bloodstream infections, surgical antimicrobial prophylaxis and surgical site infections, and influenza vaccination coverage rates for patients and staff are indicators which should be considered.

While we believe a statewide system would be best, we are prepared to work with local hospitals to set up an appropriate system of reporting HAIs within Los Angeles County if the state does not wish to move in this direction at this time. Under current law, a local system would be voluntary and require cooperation by the local hospitals. We believe that information on each hospital outbreak will be much less helpful to consumers, and more difficult to interpret, than the overall infection rates suggested by HICPAC. However, we believe that, combined with other infection control information, this specific hospital outbreak information may have some benefit and we therefore favor its disclosure in an appropriate manner.

Public health protection always takes precedence in any outbreak. Thus, any time we are aware of an outbreak that warrants notification of patients and prospective patients, we require that the hospital do so or we will provide this information to the public ourselves.

It will be necessary for changes in State laws on release of information for public disclosure of HAIs (including outbreaks) in a standardized and easily understood form while continuing to maintain patient confidentiality as provided by the Health Insurance Portability and Accountability Act (HIPAA) and

preserving the close working relationships and confidential feedback of performance data from local health departments to healthcare institutions and providers.

We have shared our State communication with Mr. Ornstein. In discussions with us, Mr. Ornstein has expressed concerns that we have not adopted a more regulatory approach to identifying underreporting of hospital outbreaks nor sought penalties for hospitals that do not report an outbreak, referencing the initiatives contained in the Department's memos to you in 2002. He has indicated that he will write about this issue in the near future.

Attached is a summary of the initiatives we described 2002 and the status of implementation of those steps.

Please let us know if you have any questions or need additional information regarding this issue.

TLG:JEF:rk-f

Attachment

c: Chief Administrative Officer
County Counsel
Executive Officer, Board of Supervisors

UPDATE ON STRENGTHENING THE ROLE OF DHS IN HEALTHCARE FACILITY INFECTIOUS DISEASE OUTBREAKS

In the Department's memo on July 11, 2002, "Update on DHS Response to Legionella Outbreak," the Department described a number of steps that it was taking to strengthen its role in helping to ensure appropriate measures were being taken to control outbreaks of disease, especially in hospitals. This is an update on the progress, to date, in implementing these steps. Our goal is to increase reporting and to take any actions necessary to ensure the public's health and safety.

Acute care facility outbreaks are defined as clusters of nosocomial infections occurring above a baseline or threshold level for a facility or specific unit. Under California law, an outbreak of disease within the facility shall be reported to the local health officer (Public Health's Acute Communicable Disease Control (ACDC) unit and to the district office of State Licensing and Certification (Public Health's Health Facilities Inspection Division).

ACDC has strengthened its relationships with hospitals and further promoted open and prompt communication. ACDC restructured and renamed its Hospital Outreach Unit (HOU). Using resources from the Bioterrorism Preparedness and Response Grant, it increased the personnel assigned to this function from 2.5 to 9 FTEs.

The mission of the new HOU is to enhance emerging infectious disease preparedness and response efforts and improve hospital disease reporting by hospitals in LAC through strengthened communications, collaborations, and consolidation of resources. The HOU's Liaison Public Health Nursing Project began in November 2003. Public health nurses have partnered with hospital infection control professionals (ICPs) and other key hospital personnel to assess hospitals' reporting systems, improve the disease reporting processes, and provide consultation, education/training, and other public health services and referrals.

Staff also attended, by invitation, the Infection Control Committees (ICC) of eleven health facilities, including: Citrus Valley, Garfield, Glendale Adventist, Huntington Memorial, Methodist, San Dimas, San Gabriel Valley, Brotman, LAC+USC, Centinela, and UCLA, Medical Centers. Such committees are mandated by the national Joint Commission on Accreditation of Healthcare Organizations (JCAHO). While attendance is by invitation, meeting minutes may be reviewed by licensing and JCAHO inspectors to ensure compliance. Attendance and participation by Public Health provides a regular opportunity to comment on hospital infection control findings and practices. The Department is in the process of assuring that ACDC staff attend all of the LAC DHS Hospital ICC meetings.

HOU staff are also active members of all three Los Angeles chapters of the Association of Professionals in Infection Control and Epidemiology (APIC), a professional organization promoting reduction of hospital acquired infections, among other goals.

It should be noted that LACDHS is among a very small group of state or local health departments nationally with staff dedicated to monitoring and investigating hospital outbreaks. According to CDC staff, only four states (California, Florida, Minnesota, and Tennessee) provide staff specific to this task, while other state health departments may have staff with expertise in the field but not dedicated exclusively to hospital infections. Among several large local health departments canvassed, none has a specific division for nosocomial infections and outbreaks (Boston, MA; Chicago, IL; Harris County, TX [Houston]; Miami, FL; New York City, NY; Philadelphia, PA; Seattle, WA).

Follow-up on proposed actions in DHS July 11, 2002 Memo to the Board

1. *Continued review of outbreaks and investigations, including identification of those that warrant public notification:*

   Currently, the Directors of Health Services and Public Health review all newly reported communicable disease investigations and outbreaks on a weekly basis. Emergent outbreaks are reported and reviewed immediately.

   Hospital outbreaks that pose a public danger are, fortunately, not common. Since the Legionnaires' disease outbreak in 2002, we have had two examples of situations that put patients at risk in hospital, where notification was important.

   We used patient and physician notification for a hospital outbreak of Methicillin-Resistant *Staphylococcus aureus,* or MRSA, in June 2004 to alert pregnant women who were scheduled for delivery, and the parents of newborns who may have been exposed during the outbreak to recommend that they discuss this with their physicians, the infection control practitioner at the hospital, or ACDC.

   In January 2005, an infection in a cardiac surgery ward led the hospital to postpone all elective surgeries while cooperating with ACDC 's investigation. Patients needing urgent surgery were adequately protected with appropriate antibiotics even as the investigators worked to pinpoint the problem. The media did report on this situation. As in many similar outbreaks, a specific source or cause was not identified, but new cases ceased after control measures were instituted. After the investigation, hospital administration praised the investigators from ACDC and CDC for their untiring efforts to root out the outbreak's causes.

   <u>The Department is prepared, and will not hesitate, to notify the public whenever we feel that the public's health is at increased risk due to an outbreak in a hospital or any other setting.</u>

2. *Evaluate, in consultation with County Counsel, the Department's authority to increase monitoring activities at health facilities through random and unannounced site visits and to notify the public of any deficiencies noted in these visits:*

   Following discussions with County Counsel, we do not believe that the Department has the authority to make random and unannounced site visits. If ACDC receives an outbreak report or a communicable disease report, it has the authority to review the hospital records in furtherance of its mandate for disease control. If the Health Facilities Inspection Division receives a complaint which alleges lapses in infection control, it can review hospital records to investigate the complaint. Often, an outbreak will be reported to both ACDC and Health Facilities and they will coordinate their reviews. For these reasons, ACDC has emphasized the collaborative outreach processes described above.

   Should any report and a related investigation indicate a situation where the public, patients, or hospital staff are at increased risk of disease, then the public, patients and/or hospital staff will be notified, as appropriate. The Board of Supervisors will be alerted to any significant outbreak that requires public notification.

3. *Develop criteria to determine when health facilities with nosocomial (hospital acquired) infections should notify patients upon admission that the facility is the site of an on-going outbreak or outbreak investigation*:

   The parameters involved in determining when health facilities with nosocomial infections should notify patients before or upon admission about possible exposure to these infections are complex. From our perspective, such parameters include the severity and transmissibility of the disease, the likelihood that the control measures implemented will stop transmission, even if the exact source of the original transmission has not been identified, and patient "mix" in the hospital (e.g., the numbers of patients that are immune compromised, pediatric versus adult populations). Thus, each infection as a source of potential risk to patients needs to be evaluated on a case-by-case basis.

4. *Greater utilization of current legal and regulatory avenues to ensure compliance.*

   The Department recognizes that outbreaks are significantly under-reported and this problem exists throughout the country. Hospitals have indicated that the reasons for underreporting include: lack of knowledge of disease reporting mandates, lack of resources, and fear of negative consequences.

   Concerted DHS outreach and education of staff at hospitals and other healthcare facilities regarding their legal obligations to report diseases or unusual clusters of disease has yielded increased compliance in reporting. Since creation of the Liaison Public Health Nursing (PHN) Project, we have seen an increase in outbreak and illness situation reporting from acute care facilities in the County, compared to previous years. In 2004, 29 outbreaks were reported, compared with only 8 in 2003. The previous 5-year average was 18.2 outbreaks per year. In January and February 2005, there were 12 outbreaks reported in acute care facilities compared to just 5 outbreaks reported in January and February 2004.

5. *Seek increased penalties through state legislation for non-compliance with disease reporting law and non-compliance with Health Officer orders, as necessary to ensure compliance*:

   The Department believes that current law provides sufficient regulatory authority for the Health Officer to require actions by hospitals and other health care organizations to protect the public from any infectious disease threat, once an outbreak is reported. Hospitals have a duty to report disease outbreaks and may expose themselves to liability if patients determine that the hospital did not report an outbreak or take appropriate steps to inform physicians and patients. This potential liability is likely to be a much stronger incentive for reporting than an increased state penalty.

   We have opted to start to address the under reporting problem through concerted outreach and education about each institution's responsibility to report to DHS consistent with state law and regulations and county ordinances. This approach appears to be working but we plan to continue to evaluate its effectiveness on a continuing basis and to reconsider seeking additional legislative changes to impose stronger non-reporting penalties if voluntary compliance is not being achieved.

6. *Increase the interaction and collaboration between the Department's Acute Communicable Disease Control, Environmental Health (EH), and Health Facilities Licensing Divisions to provide that the surveillance, monitoring, and regulatory roles of these agencies are coordinated to ensure staff are able to identify and respond appropriately.*

7. These Programs have increased their interaction and collaboration. ACDC and EH are frequently in contact regarding joint investigations on food borne outbreaks that involve the need for EH to inspect the physical facilities of restaurants while ACDC conducts an epidemiological investigation of implicated foods or areas. EH and ACDC work together on hospital outbreaks on an as needed basis if there is an environmental health component to the investigation.

   ACDC provides reports of all investigations to the Health Facilities Inspection Division and the Health Facilities Inspection Division reviews these reports in the context of its licensing and inspection activities. Should the Health Facilities Inspection Division discover potential outbreak or disease reporting problems, either in routine or complaint inspections of facilities, ACDC is notified to follow up.

8. *Notifying all hospitals of their obligation to report incidents of specific disease to the Department's Health Officer.*

   Information on reporting requirements and what constitute notifiable diseases and events are published in "The Public's Health" and sent to all healthcare facilities and providers in January of each year. In addition, the HOU make presentations at regional hospital meetings, make periodic visits, and maintain and update current contact lists for key hospital providers in infection control, emergency department, laboratory, and information systems.

COUNTY OF LOS ANGELES
DEPARTMENT OF HEALTH SERVICES
Public Health

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March 3, 2005

Richard Jackson, M.D., M.P.H.
State Health Officer
State Department of Health Services
501 Capitol Ave., Suite 6001, (95814)
P.O. Box 997413 (M/S 0028)
Sacramento 95899-7413

Dear Dr. Jackson,

I am writing regarding the issue of public disclosure of healthcare-associated infections (HAIs). The Los Angeles County Department of Health Services (LAC DHS) supports the concept of public disclosures of meaningful information on HAIs in a manner that would assist consumers in considering healthcare options.

LAC DHS would like to collaborate with the California Department of Health Services (CA DHS) to develop and implement an appropriate system of public reporting of HAIs consistent with the Centers for Disease Control and Prevention (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) "Guidance on Public Reporting of Healthcare-Associated Infections" and existing State laws on release of information. It appears that changes in State laws could be required regarding release of information, maintenance of patient confidentiality as provided by the Health Insurance Portability and Accountability Act (HIPAA), and public disclosure of HAIs in a standardized and easily understood form. These changes, as well as provision of sufficient information on how to interpret the disclosed data, are important to empower consumers who look at this data and to preserve the close working relationships and confidential feedback of performance data from local health departments to healthcare institutions and providers. We believe that hospital outbreak information will be much less helpful to consumers, and more difficult to interpret, than the overall infection rates suggested by HICPAC. However, we believe that, combined with other infection control information, this type of data may have some marginal benefit and we therefore favor its disclosure. Provisions for such disclosure, under appropriate circumstances, will require change in State law.

It is understood that, since 2002, four states (Illinois, Pennsylvania, Missouri, and Florida) have already enacted legislation mandating hospitals and healthcare organizations to publicly disclose healthcare-associated infections (HAIs) and similar legislative efforts are underway in several other states.

Although the HICPAC, based on a scientific literature review, concluded that there is insufficient evidence at this time to recommend for or against public reporting of HAIs, the Los Angeles County Department of Health Services (LAC DHS) believes it would be in the public's best interest to establish more open and transparent processes by developing and implementing an appropriate system of public reporting of HAIs.

The specific recommendations of HICPAC that may be relevant for LAC DHS and CA DHS are "that states establishing public reporting systems for HAIs select one or more of the following process or outcome measures as appropriate for hospitals or long-term care facilities in their jurisdictions: (1) central-line insertion practices; (2) surgical antimicrobial prophylaxis; (3) influenza vaccination coverage among patients and healthcare personnel; (4) central line-associated bloodstream infections; and (5) surgical site infections following selected operations."

It is noted that HICPAC worked closely with, and their Guidance was endorsed by, the Association for Professionals in Infection Control and Epidemiology, the Council of State and Territorial Epidemiologists, and the Society for Healthcare Epidemiology of America. Similarly, it we propose that LAC DHS and CA DHS work closely with organizations and associations in California with interests in the issue, including:, the California Conference of Local Health Officials (CCLHO), the California Hospital Association (CHA) and Health Association of Southern California, and the California Association for Professionals in Infection Control and Epidemiology Coordinating Council (CACC).

We welcome your thoughts on this issue and look forward to working with you, our sister local health departments, and our other collaborative partners to develop and implement an appropriate system of public reporting of HAIs.

Sincerely,

Jonathan E Fielding

Jonathan E. Fielding, M.D., M.P.H.
Director of Public Health and Health Officer

JEF:RK-F:ej

COUNTY OF LOS ANGELES
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March 3, 2005

Charles Ornstein
Health Policy Reporter
The Los Angeles Times
202 W. First Street
Los Angeles, CA 90012

Re: February 9, 2005 Public Records Act Request

Dear Mr. Ornstein:

Thank you for your February 9 public records act request. The Los Angeles County Department of Health Services ("DHS") supports the concept of public disclosures of meaningful information on healthcare-associated infections ("HAIs") in a manner that would assist consumers in considering healthcare options.

However, DHS has determined that your February 9 request for public records seeks non-disclosable records. For the reasons stated below, DHS has determined that the documents identified in your request are excepted from disclosure under the California Public Records Act by Government Code § 6254(k) because they are prohibited from disclosure by state law as implemented through the California Code of Regulations.

On February 9, you made the following request via e-mail to DHS:

- The names of all hospitals that have reported infections to the Department of Health Services in each of the past three years, along with the types of infections reported and the number of patients involved, and

- The ongoing release of such reports as they became available, going forward.

These records are acquired by DHS in response to communicable disease case reports made by hospitals within Los Angeles County. The information contained in these reports "is acquired in confidence and shall not be disclosed by the local health officer except as authorized by these regulations, as required by state or federal law or with the written consent of the individual to whom the information pertains or the legal representative of the individual." (Title 17

provided by the regulations are listed in section 2501(f)(1)-(3), and are not applicable to your request. Thus, the County health officer is precluded by law from releasing the records described in your request.

The DHS has written to the California Department of Health Services ("CA DHS") to recommend that an appropriate system of public reporting of HAIs, consistent with the Centers for Disease Control and Prevention ("CDC") Healthcare Infection Control Practices Advisory Committee's ("HICPAC") "Guidance on Public Reporting of Healthcare-Associated Infections" and existing State laws on release of information, be developed and implemented (copies of the letter to CA DHS and the HICPAC Guidance document are attached). While we believe a statewide system would be best, we are prepared to work with local hospitals to set up an appropriate system of reporting HAIs within Los Angeles County if the state does not wish to move in this direction at this time. However, under current law, a local system would be voluntary and require cooperation by the local hospitals. We believe that hospital outbreak information will be much less helpful to consumers, and more difficult to interpret, than the overall infection rates suggested by HICPAC. However, we believe that, combined with other infection control information, this type of data may have some marginal benefit and we therefore favor its disclosure.

As you are aware, since 2002, four states (Illinois, Pennsylvania, Missouri, and Florida) have enacted legislation mandating hospitals and healthcare organizations to publicly disclose (HAIs) and similar legislative efforts are underway in several other states.

Although the HICPAC, based on a scientific literature review, concluded that there is insufficient evidence at this time to recommend for or against public reporting of HAIs based on whether this type of reporting affects consumers choice of health care providers, the Los Angeles County Department of Health Services (LAC DHS) believes it would be in the public's best interest to encourage more open and transparent processes by developing and implementing an appropriate system of public reporting of HAIs.

We have also noted that it may be necessary for changes in State laws on release of information to continue to maintain patient confidentiality as provided by the Health Insurance Portability and Accountability Act (HIPAA), allow for public disclosure of HAIs (including outbreaks) in a standardized and easily understood form, and continue to preserve the close working relationships and confidential feedback of performance data from local health departments to healthcare institutions and providers.

We welcome any comments you may have on the HIPAC guidance document and the types of information you feel would be most beneficial to your readers and the overall public.

Sincerely,

Jonathan E Fielding

Jonathan E. Fielding, M.D., M.P.H.
Director of Public Health and Health Officer

JEF:RKF:ej

GUIDANCE ON PUBLIC REPORTING OF HEALTHCARE-ASSOCIATED INFECTIONS

Recommendations of the Healthcare Infection Control Practices Advisory Committee

Executive Summary

Healthcare-associated infections (HAIs) are a major public health problem in the United States. In hospitals alone, HAIs account for an estimated 2 million infections, 90,000 deaths, and $4.5 billion dollars in excess healthcare costs annually. Since 1970, a group of U.S. hospitals (now numbering nearly 300) has voluntarily reported to the Centers for Disease Control and Prevention (CDC), on a confidential basis, data on selected HAIs that occur in their hospitals.

Since 2002, four states have enacted legislation that requires healthcare organizations to publicly disclose HAI rates. Similar legislative efforts are underway in several other states. Advocates of mandatory public reporting of HAIs believe that making such information publicly available will enable consumers to make more informed choices about their healthcare and improve overall healthcare quality by reducing HAIs. Further, they believe that patients have a right to know this information. However, others have expressed concern that the reliability of public reporting systems may be compromised by institutional variability in the definitions used for HAIs, or in the methods and resources used to identify HAIs.

Presently, there is insufficient evidence on the merits and limitations of an HAI public reporting system. Therefore, the Healthcare Infection Control Practices Advisory Committee (HICPAC) has not recommended for or against mandatory public reporting of HAI rates. However, HICPAC has developed this guidance document based on established principles for public health and HAI reporting systems. This document is intended to assist policymakers, program planners, consumer advocacy organizations,

and others tasked with designing and implementing public reporting systems for HAIs. The document provides a framework for legislators, but does not provide model legislation.

HICPAC recommends that persons who design and implement such systems 1) use established public health surveillance methods when designing and implementing mandatory HAI reporting systems; 2) create multidisciplinary advisory panels, including persons with expertise in the prevention and control of HAIs, to monitor the planning and oversight of HAI public reporting systems; 3) choose appropriate process and outcome measures based on facility type and phase in measures to allow time for facilities to adapt and to permit ongoing evaluation of data validity; and 4) provide regular and confidential feedback of performance data to healthcare providers.

Specifically, HICPAC recommends that states establishing public reporting systems for HAIs select one or more of the following process or outcome measures as appropriate for hospitals or long-term care facilities in their jurisdictions: 1) central-line insertion practices; 2) surgical antimicrobial prophylaxis; 3) influenza vaccination coverage among patients and healthcare personnel; 4) central line-associated bloodstream infections; and 5) surgical site infections following selected operations. HICPAC will update these recommendations as more research and experience become available.

Introduction

Consumer demand for healthcare information, including data about the performance of healthcare providers, has increased steadily over the past decade. Many state and national initiatives are underway to mandate or induce healthcare organizations to publicly disclose information regarding institutional and physician performance. Mandatory public reporting of healthcare performance is intended to enable stakeholders, including consumers, to make more informed choices on healthcare issues.

Public reporting of healthcare performance information has taken several forms. Healthcare performance reports (report cards and honor rolls) typically describe the outcomes of medical care in terms of mortality, selected complications, or medical errors and, to a lesser extent, economic outcomes. Increasingly, process measures (i.e., measurement of adherence to recommended healthcare practices, such as handwashing) are being used as an indicator of how well an organization adheres to established standards of practice with the implicit assumption that good processes lead to good healthcare outcomes. National healthcare quality improvement initiatives, notably those of the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), the Centers for Medicare & Medicaid Services (CMS), and the Hospital Quality Alliance, use process measures in their public reporting initiatives.

Healthcare-associated infections (HAIs) are infections that patients acquire during the course of receiving treatment for other conditions (see Glossary for full definition of this and other terms used in this document). In hospitals alone, HAIs account for an estimated 2 million infections, 90,000 deaths, and $4.5 billion dollars in excess healthcare costs annually (1); however, few of the existing report cards on hospital performance use

HAIs as a quality indicator. Since 2002, four states (Illinois, Pennsylvania, Missouri, and Florida) have enacted legislation mandating hospitals and healthcare organizations to publicly disclose HAI rates. Similar legislative efforts are underway in several other states.

Because of the increasing legislative and regulatory interest in this area, the Healthcare Infection Control Practices Advisory Committee (HICPAC) conducted a scientific literature review to evaluate the merits and limitations of HAI reporting systems. We found no published information on the effectiveness of public reporting systems in reducing HAIs. Therefore, HICPAC has concluded that there is insufficient evidence at this time to recommend for or against public reporting of HAIs.

However, to assist those who will be tasked with designing and implementing such reporting systems, HICPAC presents the following framework for an HAI reporting system and recommendations for process and outcome measures to be included in the system. The framework and recommendations are based on established principles for public health and HAI surveillance. This document is intended primarily for policymakers, program planners, consumer advocacy organizations, and others who will be developing and maintaining public reporting systems for HAI. The document does not provide model legislation.

This document represents the consensus opinion of HICPAC. HICPAC is a federal advisory committee that was established in 1991 to provide advice and guidance to the Department of Health and Human Services and CDC regarding surveillance, prevention, and control of HAIs and related events in healthcare settings. These recommendations also have been endorsed by the Association for Professionals in

Infection Control and Epidemiology, the Council of State and Territorial Epidemiologists, and the Society for Healthcare Epidemiology of America. These recommendations will be updated as new information becomes available.

Essential Elements of a Public Reporting System for HAIs

As a first step, the goals, objectives, and priorities of a public reporting system should be clearly specified and the information to be monitored should be measurable to ensure that the system can be held accountable by stakeholders. The reporting system should collect and report healthcare data that are useful not only to the public, but also to the facility for its quality improvement efforts. This can be achieved by selection of appropriate measures and patient populations to monitor; use of standardized case-finding methods and data validity checks; adequate support for infrastructure, resources, and infection control professionals; adjustment for underlying infection risk; and production of useful and accessible reports for stakeholders, with feedback to healthcare providers. The planning and oversight of the system should be monitored by a multidisciplinary group composed of public health officials, consumers, healthcare providers, and healthcare infection control professionals.

Identifying Appropriate Measures of Healthcare Performance

Monitoring both process and outcome measures and assessing their correlation is a comprehensive approach to quality improvement. Standardized process and outcome measures for national healthcare performance for hospitals, nursing homes, and other settings have been endorsed through the National Quality Forum (NQF) voluntary consensus process (2-4). NQF also has developed a model policy on the endorsement of

proprietary performance measures (5). Several other agencies and organizations, including CDC, CMS, the Agency for Healthcare Quality and Research, JCAHO, the Leapfrog organization, and the National Committee for Quality Assurance, also have developed healthcare quality measures. Healthcare performance reports should identify the sources and endorsers of the measures and the sources of the data used (e.g., administrative or clinical).

Process measures are desirable for inclusion in a public reporting system because the target adherence rate of 100% to these practices is unambiguous. Furthermore, process measures do not require adjustment for the patient's underlying risk of infection. Process measures that are selected for inclusion in a public reporting system should be those that measure common practices, are valid for a variety of healthcare settings (e.g., small, rural vs. large, urban hospitals); and can be clearly specified (e.g., appropriate exclusion and inclusion criteria). Process measures meeting these criteria include adherence rates of central-line insertion practices and surgical antimicrobial prophylaxis and coverage rates of influenza vaccination for healthcare personnel and patients/residents (Table 1). Collection of data on one or more of these process measures already is recommended by the NQF and required by CMS and JCAHO for their purposes.

Outcome measures should be chosen for reporting based on the frequency, severity, and preventability of the outcomes and the likelihood that they can be detected and reported accurately (6). Outcome measures meeting these criteria include central line-associated, laboratory-confirmed primary bloodstream infections (CLA-LCBI) in intensive care units (ICU) and surgical site infections (SSIs) following selected

operations (Table 2). Although CLA-LCBIs and SSIs occur at relatively low rates, they are associated with substantial morbidity and mortality and excess healthcare costs. Also, there are well-established prevention strategies for CLA-LCBIs and SSIs (7,8). Therefore, highest priority should be given to monitoring these two HAIs and providers' adherence to the related processes of care (i.e., central-line insertion practices for CLA-LCBI and surgical antimicrobial prophylaxis for SSIs).

Use of other HAIs in public reporting systems may be more difficult. For example, catheter-associated urinary tract infections, though they may occur more frequently than CLA-LCBIs or SSIs, are associated with a lower morbidity and mortality; therefore, monitoring these infections likely has less prevention effectiveness relative to the burden of data collection and reporting. On the other hand, HAIs such as ventilator-associated pneumonia, which occur relatively infrequently but have substantial morbidity and mortality, are difficult to detect accurately. Including such HAIs in a reporting system may result in invalid comparisons of infection rates and be misleading to consumers.

Monitoring of process and outcome measures should be phased in gradually to allow time for facilities to adapt and to permit ongoing evaluation of data validity.

Identifying Patient Populations for Monitoring

CDC (9) and other authorities (10) no longer recommend collection or reporting of hospital-wide overall HAI rates because 1) HAI rates are low in many hospital locations (which makes routine inclusion of these units unhelpful), 2) collecting hospital-wide data is labor intensive and may divert resources from prevention activities, and 3) methods for hospital-wide risk adjustment have not been developed. Rather than

hospital-wide rates, reporting rates of specific HAI for specific hospital units or operation-specific rates of SSIs is recommended (9). This practice can help ensure that data collection is concentrated in populations where HAIs are more frequent and that rates are calculated that are more useful for targeting prevention and making comparisons among facilities or within facilities over time.

Case-Finding

Once the population at risk for HAIs has been identified, standardized methods for case-finding should be adopted. Such methods help to reduce surveillance bias (i.e., the finding of higher rates at institutions that do a more complete job of case-finding). Incentives to find cases of HAI may be helpful. Conversely, punitive measures for hospitals that report high rates may encourage underreporting.

Traditional case-finding methods for HAIs include review of medical records, laboratory reports, and antibiotic administration records. However, these standard case-finding methods can be enhanced. For example, substantially more SSIs are found when administrative data sources (e.g., *International Classification of Diseases, 9th Revision* [ICD-9], discharge codes) are used in combination with antimicrobial receipt to flag charts for careful review (11,12). However, the accuracy of case-finding using ICD-9 codes alone likely varies by HAI type and by hospital. Therefore, ICD-9 discharge codes should not be relied upon as the sole source for HAI monitoring systems.

Traditional HAI case-finding methods were developed in an era when patients' lengths of hospitalization were much longer than they are today, allowing most HAIs to be detected during the hospital stay. However, for SSIs in particular, the current climate of short stays and rapid transfers to other facilities makes accurate detection difficult

because as many as 50% of SSIs do not become evident until after hospital discharge or transfer (13). Since there is no consensus on which postdischarge surveillance methods are the most accurate and practical for detection of SSIs (7), the limitations of current case-finding methods should be recognized if SSIs are selected for inclusion in mandatory reporting systems.

Validation of Data

A method to validate data should be considered in any mandatory reporting system to ensure that HAIs are being accurately and completely reported and that rates are comparable from hospital to hospital or among all hospitals in the reporting system. The importance of validation was emphasized by a CDC study of the accuracy of reporting to the NNIS system, which found that although hospitals identified and reported most of the HAIs that occurred, the accuracy varied by infection site (14).

Resources and Infrastructure Needed for a Reporting System

A reporting system can not produce quality data without adequate resources. At the institution level, trained personnel with dedicated time are required, e.g., infection control professionals to conduct HAI surveillance. At the system level, key infrastructure includes instruction manuals, training materials, data collection forms, methods for data entry and submission, databases to receive and aggregate the data, appropriate quality checks, computer programs for data analysis, and standardized reports for dissemination of results. Computer resources within reporting systems must include both hardware and software and a standard user interface. In order to collect detailed data on factors such as use of invasive devises (e.g., central lines), patient care location within the facility, and

type of operation, extensive data dictionaries and coding schema must be developed and maintained.

HAI Rates and Risk Adjustment

For optimal comparison purposes, HAI rates should be adjusted for the potential differences in risk factors. For example, in the NNIS system, device-associated infections are risk adjusted by calculating rates per 1,000 device-days (e.g., CLA-LCBI per 1,000 central line-days) and stratifying by unit type (15,16,17). For that system, risk adjustment of SSIs is done by calculating of operation-specific rates stratified by a standardized risk index (17,18,19). Although these methods do not incorporate all potential confounding variables, they provide an acceptable level of risk adjustment that avoids the data collection burden that would be required to adjust for all variables.

Risk adjustment is labor intensive because data must be collected on the entire population at risk (the denominator) rather than only the fraction with HAIs (the numerator). Risk adjustment can not correct for variability among data collectors in the accuracy of finding and reporting events. Further, current risk-adjustment methods improve but do not guarantee the validity of inter-hospital comparisons, especially comparisons involving facilities with diverse patient populations (e.g., community versus tertiary-care hospitals).

Valid event rates are facilitated by selecting events that occur frequently enough and at-risk populations that are large enough to produce adequate sample sizes. Unfortunately, use of stratification (e.g., calculation of rates separately in multiple categories) for risk adjustment may lead to small numbers of HAIs in any one category

and thereby yield unstable rates, as is the case of a small hospital with low surgical volume.

Producing Useful Reports and Feedback

Publicly released reports must convey scientific meaning in a manner that is useful and interpretable to a diverse audience. Collaboration between subject matter experts, statisticians, and communicators is necessary in developing these reports. The reports should provide useful information to the various users and highlight potential limitations of both the data and the methods used for risk adjustment. In a new reporting system, data should be examined and validated before initial release; in addition, sufficient sample size should be accumulated so that rates are stable at the time of public release. Lastly, feedback of performance data should be given to healthcare providers regularly so that interventions to improve performance can be implemented as quickly as possible. For example, feedback of SSI rates to surgeons has been shown to be an important component of strategies to reduce SSI risk (20).

Adapting Established Methods for Use in Mandatory Reporting Systems

Where appropriate, developers of reporting systems should avail themselves of established and proven methods of collecting and reporting surveillance data. For example, many of the methods, attributes, and protocols of CDC's NNIS system may be applicable for public reporting systems. A detailed description of the NNIS methodologies has been described elsewhere (17), and additional information on NNIS is available at www.cdc.gov/ncidod/hip/surveill/nnis.htm.

Most reporting systems, such as NNIS, use manual data collection methods. In most instances, information in computer databases, when available, can be substituted for

manually collected data (21,22). However, when manual data collection is necessary, alternate approaches include limiting reporting to well-defined and readily identifiable events, using simpler and more objective event definitions (23), and sampling to obtain denominators (24). These approaches could decrease the burden of data collection and improve the consistency of reporting among facilities. If data collection were simplified, expanding the number of infection types and locations in which they are monitored may become more feasible.

Potential Consequences of Mandatory Public Reporting Systems

Mandatory reporting of HAIs will provide consumers and stakeholders with additional information for making informed healthcare choices. Further, reports from private systems suggest that participation in an organized, ongoing system for monitoring and reporting of HAIs may reduce HAI rates (25,26). This same beneficial consequence may apply to mandatory public reporting systems. Conversely, as with voluntary private reporting, mandatory public reporting that doesn't incorporate sound surveillance principles and reasonable goals may divert resources to reporting infections and collecting data for risk adjustment and away from patient care and prevention; such reporting also could result in unintended disincentives to treat patients at higher risk for HAI. In addition, current standard methods for HAI surveillance were developed for voluntary use and may need to be modified for mandatory reporting. Lastly, publicly reported HAI rates can mislead stakeholders if inaccurate information is disseminated. Therefore, in a mandatory public report of HAI information, the limitations of current methods should be clearly communicated within the publicly released report.

Research and Evaluation Needs

Research and evaluation of existing and future HAI reporting systems will be needed to answer questions about 1) the comparative effectiveness and efficiency of public and private reporting systems and 2) the incidence and prevention of unintended consequences. Ongoing evaluation of each system will be needed to confirm the appropriateness of the methods used and the validity of the results.

Recommendations

The Healthcare Infection Control Practices Advisory Committee (HICPAC) proposes four overarching recommendations regarding the mandatory public reporting of healthcare-associated infections (HAIs). These recommendations are intended to guide policymakers in the creation of statewide reporting systems for healthcare facilities in their jurisdictions.

1. **Use established public health surveillance methods when designing and implementing mandatory HAI reporting systems.** This process involves:
   a. selection of appropriate process and outcome measures to monitor;
   b. selection of appropriate patient populations to monitor;
   c. use of standardized case-finding methods and data validity checks;
   d. provision of adequate support and resources;
   e. adjustment for underlying infection risk; and
   f. production of useful and accessible reports to stakeholders.

   Do not use hospital discharge diagnostic codes as the sole data source for HAI public reporting systems.
2. **Create a multidisciplinary advisory panel to monitor the planning and oversight of the operations and products of HAI public reporting systems.** This team should include persons with expertise in the prevention and control of HAIs.
3. **Choose appropriate process and outcome measures based on facility type and phase in measures gradually to allow time for facilities to adapt and to permit ongoing evaluation of data validity.** States can select from the

following measures as appropriate for hospitals or long-term care facilities in their jurisdictions.

a. Three process measures are appropriate for hospitals and one (iii below) is appropriate for long-term care facilities participating in a mandatory HAI reporting system (Table 1).

    i. Central-line insertion practices (with the goal of targeting intensive care unit [ICU]-specific central line-associated, laboratory-confirmed bloodstream infections [CLA-LCBIs] can be measured by all hospitals that have the type of ICUs selected for monitoring (e.g., medical or surgical).

    ii. Surgical antimicrobial prophylaxis (with the goal of targeting surgical site infection [SSI] rates) can be measured by all hospitals that conduct the operations selected for monitoring.

    iii. Influenza vaccination coverage rates for healthcare personnel and patients can be measured by all hospitals and long-term care facilities. For example:

        1. Coverage rates for healthcare personnel can be measured in all hospitals and long-term care facilities.
        2. Coverage rates for high-risk patients can be measured in all hospitals.
        3. Coverage rates for all residents can be measured in all long-term care facilities.

b. Two outcome measures are appropriate for some hospitals participating in a mandatory HAI reporting system (Table 2).

   i. CLA-LCBIs.

   ii. SSIs following selected operations.

   Hospitals for which these measures are appropriate are those in which the frequency of the HAI is sufficient to achieve statistically stable rates. To foster performance improvement, the HAI rate to be reported should be coupled with a process measure of adherence to the prevention practice known to lower the rate (see 3ai and 3aii). For example, hospitals in states where reporting of SSIs is mandated should monitor and report adherence to recommended standards for surgical prophylaxis (see 3aii).

4. **Provide regular and confidential feedback of performance data to healthcare providers.** This practice may encourage low performers to implement targeted prevention activities and increase the acceptability of the public reporting systems within the healthcare sector.

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Table 1. Recommended Process Measures for a Mandatory Public Reporting System on Healthcare-associated Infections

Events	Measures	Rationale for Inclusion	Potential Limitations
Central line insertion (CLI) practices	Two measures (expressed as a percentage) (8): Numerators: Number of CLI in which: 1) Maximal sterile barrier precautions were used 2) Chlorhexidine gluconate (preferred) , tincture of iodine, an iodophor, or 70% alcohol used as skin antiseptic Denominator: Number of CLIs	Unambiguous target goal (100%). Risk-adjustment is unnecessary. Proven prevention effectiveness (8): Use of maximal barrier precautions during insertion and chlorhexidine skin antisepsis have been shown to be associated with an 84% and 49% reduction in central line-associated bloodstream infection rates, respectively (27,28).	Methods for data collection not yet standardized. Manual data collection likely to be tedious and labor intensive, and data are not included in medical records.
Surgical antimicrobial prophylaxis (AMP)	Three measures (expressed as a percentage) (29): Numerators: Number of surgical patients: 1) Who received AMP within 1 hour prior to surgical incision (or 2 hours if receiving vancomycin or a fluoroquinolone) 2) Who received AMP recommended for their surgical procedure 3) Whose prophylactic antibiotics were discontinued within 24 hours after surgery end time Denominator: All selected surgical patients	Unambiguous target goal (100%). Risk-adjustment is unnecessary. Proven prevention effectiveness (7): Administering the appropriate antimicrobial agent within 1 hour before the incision has been shown to reduce surgical site infections (SSIs). Prolonged duration of surgical prophylaxis (>24 hrs) has been associated with increased risk of antimicrobial-resistant SSI.	Manual data collection may be tedious and labor intensive, but data can be abstracted from medical records.

Influenza vaccination of patients and healthcare personnel	Two measures (each expressed as a percentage of coverage) (30): Numerators: Number of influenza vaccinations given to eligible patients or healthcare personnel Denominators: Number of patients or healthcare personnel eligible for influenza vaccine	Proven prevention effectiveness (30-32): Vaccination of high-risk patients and healthcare personnel has been shown to be effective in preventing influenza .	Manual data collection may be tedious and labor intensive.

Table 2. Recommended Outcome Measures for a Mandatory Public Reporting System on Healthcare-associated Infections

Events	Measures	Rationale for Inclusion	Potential Limitations
1. Central line-associated laboratory-confirmed primary bloodstream infection (CLA-LCBI)*	Numerator: Number of CLA-LCBI Denominator: Number of central-line days in each population at risk, expressed per 1,000 Populations at risk: Patients with central lines cared for in different types of intensive care units (ICUs)* Risk stratification: By type of ICU Frequency of monitoring: 12 months per year for ICU with ≤5 beds; 6 months per year for ICU with >5 beds Frequency of rate calculation: Monthly (or quarterly for small ICUs) for internal hospital quality improvement purposes Frequency of rate reporting: Annually using all the data to calculate the rate	Overall, an infrequent event but one that is associated with substantial cost, morbidity, and mortality. Reliable laboratory test available for identification (i.e., positive blood culture). Prevention guidelines exist (8) and insertion processes can be monitored concurrently. Sensitivity*: 85%; predictive value positive (PVP)*: 75% (14)	LCBI* can be challenging to diagnose since the definition includes criteria that are difficult to interpret (e.g., single-positive blood cultures from skin commensal organisms may not represent true infections.) To offset this limitation, a system could include only those CLA-LCBI identified by criterion 1, which will result in smaller numerators and therefore will require longer periods of time for sufficient data accumulation for rates to become stable/meaningful. Standard definition of central line* requires knowing where the tip of the line terminates, which is not always documented and can therefore lead to misclassification of lines.

Events	Measures	Rationale for Inclusion	Potential Limitations
2. Surgical site infection (SSI)*	Numerator: Number of SSI for each specific type of operation* Denominator: Total number of each specific type of operation, expressed per 100 Risk stratification: Focus on high-volume operations and stratify by type of operation and National Nosocomial Infections Surveillance (NNIS) SSI risk index* Alternate risk adjustment: For low-volume operations, by standardized infection ratio*	Low frequency event but one that is associated with substantial cost, morbidity, and mortality. Prevention guidelines exist (7) and certain important processes can be monitored concurrently. Sensitivity*: 67%; PVP*: 73% (14)	Rates dependent on surveillance intensity, especially completeness of post-discharge surveillance (50% become evident after discharge and may not be detected). SSI definitions include a "physician diagnosis" criterion, which reduces objectivity.

*See Glossary.

GLOSSARY

- **Central line**: A vascular infusion device that terminates at or close to the heart or in one of the great vessels. In the National Healthcare Safety Network (NHSN), the system replacing NNIS, the following are considered great vessels for the purpose of reporting central-line infections and counting central-line days: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, and common femoral veins.

  NOTE: In neonates, the umbilical artery/vein is considered a great vessel.

  NOTE: Neither the location of the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of these vessels or in or near the heart to qualify as a central line. NOTE: Pacemaker wires and other noninfusion devices inserted into central blood vessels or the heart are not considered central lines.
- **CLA-LCBI**: please see **Laboratory-confirmed primary bloodstream infection.**
- **Confounding**: The distortion of the apparent effect of an exposure on risk brought about by the association with other factors that can influence the outcome (33). Risk adjustment is performed to minimize the effects of patient co-morbidities and use of invasive devices (the confounding factors) on the estimate of risk for a unit or facility (the exposure).
- **Device-associated infection**: An infection in a patient with a device (e.g., ventilator or central line) that was used within the 48-hour period before the infection's onset.

If the time interval was longer than 48 hours, compelling evidence must be present to indicate that the infection was associated with use of the device. For catheter-associated urinary tract infection (UTI), the indwelling urinary catheter must have been in place within the 7-day period before positive laboratory results or signs and symptoms meeting the criteria for UTI were evident (17).

- **Healthcare-associated infection**: A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that a) occurs in a patient in a healthcare setting (e.g., a hospital or outpatient clinic), b) was not found to be present or incubating at the time of admission unless the infection was related to a previous admission to the same setting, and c) if the setting is a hospital, meets the criteria for a specific infection site as defined by CDC (17). (See also **Nosocomial**.)
- **Intensive-care unit (ICU):** A hospital unit that provides intensive observation, diagnostic, and therapeutic procedures for adults and/or children who are critically ill. An ICU *excludes* bone marrow transplant units and nursing areas that provide step-down, intermediate care or telemetry only. The type of ICU is determined by the service designation of the majority of patients cared for by the unit (i.e., if 80% of the patients are on a certain service [e.g., general surgery], then the ICU is designated as that type of unit [e.g., surgical ICU]). An ICU with approximately equal numbers of medical and surgical patients is designated as a combined medical/surgical ICU (17).
- **Laboratory-confirmed primary bloodstream infection (LCBI)**: A primary bloodstream infection identified by laboratory tests with or without clinical signs or

symptoms; most often associated with the use of catheters or other invasive medical devices. For the CDC surveillance definition of LCBIs, please see reference 14 or www.cdc.gov/ncidod/hip/surveill/nnis.htm.

- **NNIS SSI Risk index**: A score used to predict a surgical patient's risk of acquiring a surgical-site infection. The risk index score, ranging from 0 to 3, is the number of risk factors present among the following: a) a patient with an American Society of Anesthesiologists' physical status classification score of 3, 4, or 5 (34), b) an operation classified as contaminated or dirty infected (35,36), and c) an operation lasting over T hours, where T depends upon the operation being performed (19). Current T values can be found in the NNIS Report at www.cdc.gov/ncidod/hip/surveill/nnis.htm.
- **Nosocomial**: Originating or taking place in a hospital.
- **Outcomes**: All the possible results that may stem from exposure to a causal factor or from preventive or therapeutic interventions (33) (e.g., mortality, cost, and development of a healthcare-associated infection).
- **Predictive value positive**: The proportion of infections reported by a surveillance or reporting system that are true infections (6,14).
- **Private reporting system**: A system that provides information about the quality of health services or systems for the purposes of improving the quality of the services or systems. By definition, the general public is not given access to the data; instead, the data are typically provided to the organization or healthcare workers whose performance is being assessed. The provision of these data is intended as an intervention to improve the performance of that entity or person.

- **Process measure:** A measure of recommended infection control or other practices (e.g., compliance with hand hygiene recommendations).
- **Public reporting system:** A system that provides the public with information about the performance or quality of health services or systems for the purpose of improving the performance or quality of the services or systems.
- **Risk adjustment**: A summarizing procedure for a statistical measure in which the effects of differences in composition (e.g., confounding factors) of the populations being compared have been minimized by statistical methods (e.g., standardization and logistic regression) (33).
- **Sensitivity**: The proportion of true infections that are reported by a surveillance or reporting system. May also refer to the ability of the reporting system to detect outbreaks or unusual clusters of the adverse event (in time or place) (6,14).
- **SSI Risk Index**: please see **NNIS SSI Risk Index.**
- **Standardized infection ratio**: The standardized infection ratio as used in this document is an example of indirect standardization in which the observed number of surgical site infections (SSIs) is divided by the expected number of SSIs. The expected number of SSIs is calculated by using NNIS SSI risk index category-specific data from a standard population (e.g., the NNIS system data published in the NNIS Report) and the number of operations in each risk index category performed by a surgeon, a surgical subspecialty service, or a hospital. [Detailed explanation and examples can be found in Horan TC, Culver DH. Comparing surgical site infection rates. In: Pfeiffer JA, Ed. APIC text of infection control

and epidemiology. Washington, DC: Association for Professionals in Infection Control, 2000. Chapter 14, p. 1-7.]

- **Surgical site infection (SSI)**: An infection of the incision or organ/space operated on during a surgical procedure. For the CDC surveillance definition of an SSI, please see reference 14 or www.cdc.gov/ncidod/hip/surveill/nnis.htm.
- **Surveillance**: The ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health (6).

References

1. Centers for Disease Control and Prevention. Public Health Focus: surveillance, prevention and control of nosocomial infections. MMWR 1992;41(42):783-7.

2. Kizer KW. Establishing health care performance standards in an era of consumerism. JAMA 2001;286(10):1213-7.

3. The National Quality Forum. National voluntary consensus standards for hospital care: an initial performance measure set. Washington, DC: The National Quality Forum, 2003.

4. The National Quality Forum. Safe practices for better healthcare: a consensus report. Washington, DC: The National Quality Forum, 2003.

5. The National Quality Forum. Policy on endorsement of proprietary performance measures. Available at: QualityForum.org . 5-14-2003. 10-14-2004.

6. Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems. MMWR 2001;50(No. RR-13):1-35.

7. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR, the Hospital Infection Control Practices Advisory Committee. Guideline for prevention of surgical site infection, 1999. Infect Cont Hosp Epidemiol 1999;20(4):247-78.

8. Centers for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections [Erratum to p. 29, Appendix B published in MMWR Vol. 51, No. 32, p. 711]. MMWR 2002;51(No. RR-10):1-29.

9. Centers for Disease Control and Prevention. Nosocomial infection rates for interhospital comparison: limitations and possible solutions. Infect Control Hosp Epidemiol 1991;12:609-21.

10. Association for Professionals in Infection Control and Epidemiology. Release of nosocomial infection data [Position Paper]. APIC News 1998;17(2):1-5.

11. Platt R, Yokoe DS, Sands KE. Automated methods for surveillance of surgical site infections [Review]. Emerg Infect Dis 2001;7(2):212-6.

12. Yokoe D, Noskin G, Cunningham S, et al. Enhanced identification of postoperative infections among inpatients. Emerg Infect Dis 2004;10(11):1924-30.

13. Weigelt JA, Dryer D, Haley RW. The necessity and efficiency of wound surveillance after discharge. Arch Surg 1992;127:777-82.

14. Emori TG, Edwards JR, Culver DH, et al. Accuracy of reporting nosocomial infections in intensive-care-unit patients to the National Nosocomial Infections Surveillance System: a pilot study.[Erratum Appears in Infect Control Hosp Epidemiol 1998 Jul;19(7):479]. Infect Control Hosp Epidemiol 1998;19(5):308-16.

15. Jarvis WR, Edwards JR, Culver DH, Hughes JM, Horan TC, Emori TG, et al. Nosocomial infection rates in adult and pediatric intensive care units in the United States. Am J Med 1991;91(Suppl 3B):185S-91S.

16. Gaynes RP, Martone WJ, Culver DH, Emori TG, Horan TC, Banerjee SN, et al. Comparison rates of nosocomial infections in neonatal intensive care units in the United States. Am J Med 1991;91(Suppl 3B):192S-6S.

17. Horan TC, Gaynes R. Surveillance of nosocomial infections. In: Mayhall CG, ed. Hospital epidemiology and infection control. Philadelphia: Lippincott Williams & Wilkins, 2004:1659-1702.

18. Gaynes RP, Culver DH, Horan TC, Edwards JR, Richards C, Tolson JS. Surgical site infection (SSI) rates in the United States, 1992-1998: the National Nosocomial Infections Surveillance System basic SSI risk index. Clin Infect Dis 2001; 33(Suppl 2):S69-S77.

19. Culver DH, Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. Surgical wound infection rates by wound class, operative procedures, and patient risk index. Am J Med 1991;91(Suppl 3B):152S-157S.

20. Haley RW, Culver DH, White JW, et al. The efficacy of infection surveillance and control programs in preventing nosocomial infections in US hospitals. Am J Epidemiol 1985;121(2):182-205.

21. Trick W, Zagorski B, Tokars J, et al. Computer algorithms to detect bloodstream infections. Emerg Infect Dis 2004;10(9):1612-20.

22. Samore MH, Evans RS, Lassen A, et al. Surveillance of medical device-related hazards and adverse events in hospitalized patients.[see comment]. JAMA 2004; 291(3):325-34.

23. Yokoe DS, Anderson J, Chambers R, et al. Simplified surveillance for nosocomial bloodstream infections. Infect Control Hosp Epidemiol 1998;19(9):657-60.

24. Klevens M, Tokars J, Edwards J. Simplified methods for collection of device denominators. Abstract 144, pg. 88, Program and Abstracts Book, 14th Annual Scientific Meeting of the Society for Healthcare Epidemiology of America, April 18, 2004. Society of Healthcare, Epidemiology of America, Alexandria, VA.

25. McCall JL, Macchiaroli S, Brown RB, et al. A method to track surgical site infections. Quality Management in Health Care 1998;6(3):52-62.

26. Centers for Disease Control and Prevention. Monitoring hospital-acquired infections to promote patient safety -- United States, 1990-1999. [erratum appears in MMWR 49(09);189]. MMWR 2000;49(8):149-53.

27. Raad II, Hohn DC, Gilbreath BJ, et al. Prevention of central venous catheter-related infections by using maximal sterile barrier precautions during insertion. Infect Control Hosp Epidemiol 1994;15:231-8.

28. Chaiyakunapruk N, Veenstra DL, Lipsky BA, Saint S. Chlorhexidine compared with povidone-iodine solution for vascular catheter-site care: a meta-analysis. Ann Intern Med 2002;136(11):792-801.

29. Bratzler DW, Houck PM, Surgical Infection Prevention Guidelines Writers Workgroup, et al. Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. Clin Infect Dis 2004; 38(12):1706-15.

30. Tablan OC, Anderson LJ, Besser R, Bridges C, Hajjeh R. Guidelines for preventing healthcare-associated pneumonia, 2003. MMWR 2004;53(No. RR-3):1-36.

31. Centers for Disease Control and Prevention. Prevention and control of influenza. MMWR 2004;53(No. RR-06):1-40.

32. Centers for Disease Control and Prevention. Immunization of health-care workers: recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). MMWR 1997;46(No. RR-18):1-42.

33. Last JM. A Dictionary of Epidemiology. 2nd ed. New York: Oxford University Press, 1988.

34. Anonymous. New classification of physical status. Anesthesiology 1963;24:111.

35. Garner JS. CDC Guidelines for prevention of surgical wound infections, 1985. Infect Control 1986;7:193-200.

36. Simmons BP. Guideline for prevention of surgical wound infections. Infect Control 1982;3:185-96.

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